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Spread of *Eragrostis albensis* (Poaceae) and *Dittrichia graveolens* (Asteraceae) in the southern Poland

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Abstract: New localities of *Eragrostis albensis* H. Scholz and *Dittrichia graveolens* (L.) Greuter have been found in the southern Poland. The former taxon is currently considered a kenophyte (epecophyte and holoagriophyte) in the country. It occurs on sandy alluvia along Vistula, Oder and San River Valleys as well as on anthropogenic sites mainly in the eastern and south-eastern Poland. The latter species is a recent newcomer regarded as an ephemerophyte, which so far has been reported from only one locality in Śląskie Province. In 2017 we discovered 16 new localities of *E. albensis* and five of *D. graveolens* on the territory of the southern Poland. Populations of both species consisted of few to several dozen individuals which grew within anthropogenic habitats, mainly roadsides. Distribution maps of both species in the southern Poland were presented.

Key words: new locality, expansion, spreading species, distribution, Poland

Introduction

It is commonly observed that anthropogenic habitats serve as perfect migration corridors for plants. Thus, numerous species propagate along transport networks where effective long-distance seed dispersal may occur (Clifford 1959; Tikka et al. 2001; Rauschert et al. 2017). In addition, many alien species spread rapidly through human-modified landscape and especially in this way invade new areas beyond their native distribution (Vakhlamova et al. 2016; Benedetti & Morelli 2017). In Central Europe, two species, i.e. *Eragrostis albensis* H. Scholz and *Dittrichia graveolens* (L.) Greuter, may serve as good examples of plants which follow such propagation strategy and still expand their non-native range limits (Guzik & Sudnik-Wójcikowska 2005; Michalewska & Nobis 2005; Kocián 2015).

Eragrostis albensis H. Scholz is a terophyte recently distinguished as a new species to science (Scholz 1996). It belongs to *Eragostis pectinacea-pilosa* complex which is regarded as taxonomically problematic group within large *Eragrostis* genus (Scholz 1996; Špryňar & Kubát 2004). According to Scholz (1996), *E. albensis* should be considered Central European endemic taxon which could have recently originated after rapid speciation. However, soon after it was described in Germany, *E. albensis* was also noted at numerous localities in: the Netherlands, Austria, the Czech Republic, Slovakia, Poland, Ukraine, Belarus and eastern part of Russia (Scholz 1996; Špryňar & Kubát 2004; Guzik & Sudnik-Wójcikowska 2005; Hohla 2006; Hohla & Kleesadle 2006; Scholz 2010).

The revision of herbaria materials from Poland indicated that almost all specimens previously identified as *E. pilosa* (L.) P. Beauv. should be classified as *E. albensis* (Guzik & Sudnik-Wójcikowska 2005; Michalewska & Nobis 2005). Moreover, the oldest individuals were in fact not collected in Germany; it turned out that the species was recorded much earlier in Poland, the Czech Republic and Slovakia (Guzik & Sudnik-Wójcikowska 2005; Špryňar & Kubát 2004). As a consequence, Špryňar & Kubát (2004) suggested that *E. albensis* should be treated rather as a neophyte in Central Europe, which might have probably immigrated from

the east Eurasia. In our opinion, such hypothesis seems to be much more convincing than possibility of recent speciation postulated by Scholz (1996).

Eragrostis albensis occupies natural habitats such as sandy river banks, but it also grows on anthropogenic sites, especially along roads and railway tracks (Guzik & Sudnik-Wójcikowska 1996, 2005; Michalewska & Nobis 2005; Wrzesień 2005; Kącki & Szczęśniak 2009; Nobis & Nobis 2015). Still, it is difficult to conclude whether spread of *E. albensis* began in one type of habitat or probably, in both simultaneously. Possible hypotheses were thoroughly discussed by Guzik & Sudnik-Wójcikowska 1996, 2005 and Michalewska & Nobis 2005.

In Poland, *E. albensis* is an alien species, regarded as an holoagriophyte or epecophyte. So far, it has been observed on sandy alluvia along Vistula, Oder and San River valleys (Guzik & Sudnik-Wójcikowska 1996, 2005; Kącki & Szczęśniak 2009). It also occupies many localities within anthropogenic sites mainly in eastern and south-eastern Poland (Michalewska & Nobis 2005; Wrzesień 2005; Nobis & Nobis 2006, 2010).

Another alien species to Central Europe, *Dittrichia graveolens*, is an annual plant characteristic for the flora of the Mediterranean region (Ball 1976; Brullo & de Marco 2000). Currently, its spread is observed in Western Atlantic European coast, Middle East (Brullo & de Marco 2000), Central Europe (Frank 2006; Frajman & Kaligarič 2009; Király et. al 2014; Kocián 2015) as well as in two other continents where it was introduced, i.e. North America and Australia (Kloot 1987; Brownsey et al. 2013). In Central Europe, the species' rapid expansion has been noted along roads, particularly motorways (Frajman & Kaligarič 2009; Király et. al 2014; Kocián 2015). Its presence has been recently also confirmed in Poland (Kocián 2015). In 2013 *D. graveolens* was found in Śląskie Province near the S1 expressway (DF 90 ATPOL cartogram unit); hence, the species was regarded as an ephemerophyte in the country. Although *D. graveolens* has been so far observed in Poland on only this single locality, its further spread has been suggested as very probable (Kocián 2015).

New localities of *Eragrostis albensis*

During field studies in 2017 the Authors found 16 new localities of *E. albensis* on the territory of Małopolskie Province (Fig. 1). In accordance with ATPOL cartogram method (Zając 1978) these sites are located within 9 ATPOL grid units (squares 10 km x 10 km):

DF 99 – Myślenice, Kazimierza Wielkiego Street; Stróża; **DG 09 –** Krzczonów; **EF 81 –** Marszowice near Gdów; **EG 00 –** Mszana Dolna, Krakowska Street; Kasinka Mała; Lubień; **EG 11 –** Mszana Górna; **EG 12 –** Szczawa; Kamienica; **EG 23 –** Maszkowice near Jazowsko; Tylmanowa; Zabrzeż; **EG 24 –** Naszacowice; **EG 33 –** Kłodne near Tylmanowa; Krościenko nad Dunajcem, Sobieskiego Street and Jagiellońska Street.

The distribution map of *E. albensis* in the southern Poland (Fig. 1) was based on Nobis & Nobis 2010, 2015 and it was supplemented with newly found localities. Some of them are currently the southernmost records of *E. albensis* in Poland (Fig. 1). In Małopolskie Province the species spreads within anthropogenic habitats. It grows in the crevices between roads and curbs or in pavement slabs. In all localities from few to several dozen individuals were noted. It is highly probable that further spread of *E. albensis* will be observed in southern Poland in the nearest future.

New localities of *Dittrichia graveolens*

In 2017 the species was found on roadsides, on few localities along A4 motorway between Kraków and Katowice as well as on western ring road of Kraków (Fig. 2). In accordance with ATPOL cartogram method (Zając 1978) these sites are located within four ATPOL grid units (squares 10 km x 10 km): **DF 55** – Wygoda; **DF 56** – Chrzanów; Bolęcin; **DF 66** – Regulice; **DF 69** – Kryspinów / Kraków Bielany. In all localities from few to several dozen individuals

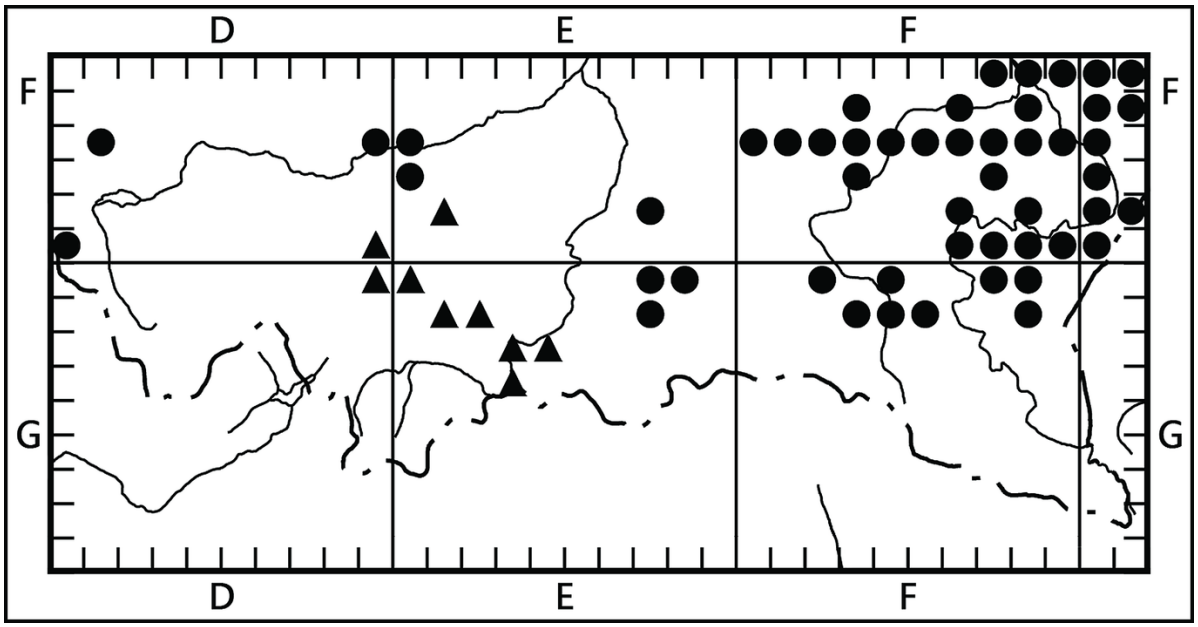

Fig 1: Distribution of *Eragrostis albensis* H. Scholz in the southern Poland: ● – known localities (according to Nobis & Nobis 2010, 2015); ▲ – new localities.

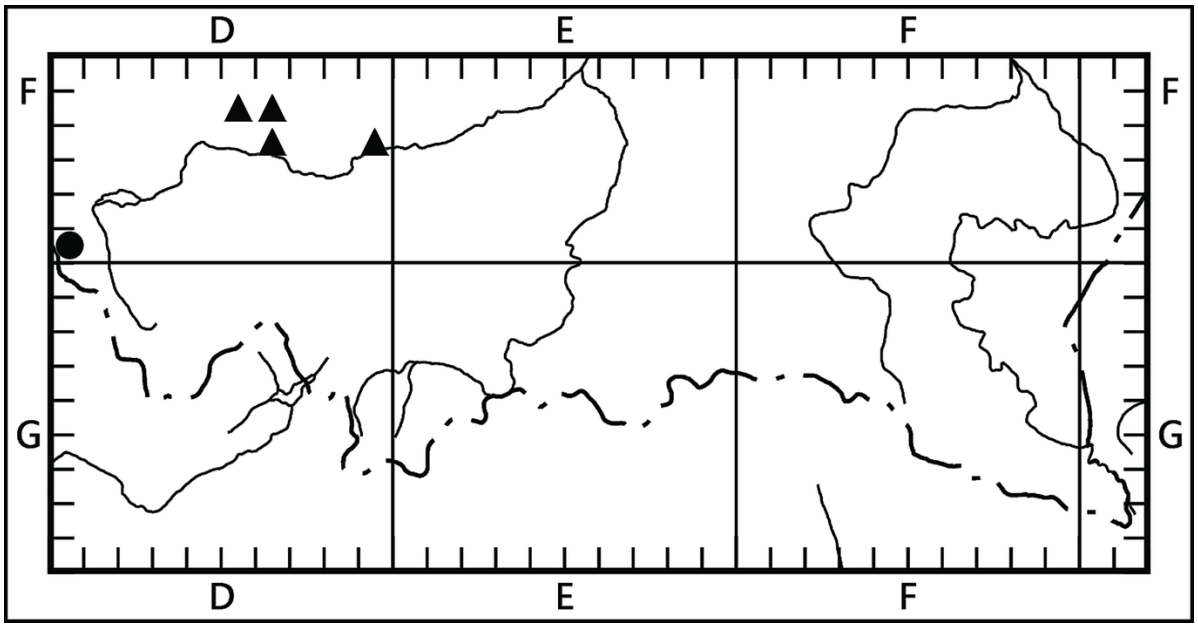

Fig 2: Distribution of *Dittrichia graveolens* (L.) Greuter in the southern Poland: ● – known locality (according to Kocián 2015); ▲ – new localities.

of the species were noted. Our findings proved that *D. graveolens* quickly extending its range in southern Poland, and currently the species should be regarded as an epecophyte, established in anthropogenic habitats. It is very likely that further localities of this potentially invasive species will soon be found also in other parts of the country.

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